UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,714	08/12/2003	Iain Cooper	78.1134	1713

26932 7590 08/03/2005

JEFFREY E. DALY
GRANT PRIDECO, L.P.
400 N. SAM HOUSTON PARKWAY EAST
SUITE 900
HOUSTON, TX 77060

EXAMINER	
BOMAR, THOMAS S	

ART UNIT	PAPER NUMBER
3672	

DATE MAILED: 08/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,714	COOPER ET AL.	
	Examiner	Art Unit	
	Shane Bomar	3672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 August 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/29/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "36" has been used to designate both the first end of the bit and the internal passaging. This also occurs in paragraphs [0031] and [0033] of the spec. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 122. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 64. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The abstract of the disclosure is objected to because of the implied phrase "is disclosed". Correction is required. See MPEP § 608.01(b).

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The disclosure is objected to because of the following informalities: in the first line of paragraphs [0033] and [0035], the recitation of "internal passaging…with allows" should most likely be --internal passaging…which allows--.

Appropriate correction is required.

Claim Objections

7. Claims 1 and 11 are objected to because of the following informalities: in line 4 of claim 1, the second recitation of "a surface pump" should most likely be --the surface pump-- so that it does not seem that another pump is being claimed; in line 2 of claim 11, the recitation of "the device" is somewhat confusing since it is unclear which device is being referred to. Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-7 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent 4,905,775 to Warren et al.

Regarding claim 1, Warren et al disclose a method for inherently optimizing drilling fluid hydraulics when drilling a well bore, the drilling fluid supplied by a surface pump 10 through a drill string 22 to a drill bit 106, comprising the step of adjusting the flow rate of the surface pump and a fluid pressure drop across the drill bit while drilling such that the drill bit drilling fluid hydraulics are optimized for a given drilling condition (see Figs. 1 and 5-7, and col. 10, line 58 through col. 13, line 54).

Regarding claim 2, the method comprising the further step of controlling the fluid pressure drop and flow rate across at least one additional drilling fluid using device 24 in the drill string intermediate the surface pump and the drill bit (see Fig. 1 and col. 3, lines 44-58, wherein it is stated that the pressure drop and flow rate across both the motor and the bit is being controlled).

Regarding claim 3, the drill bit of claim 1 comprises a plurality of fluid orifices 126 or 136 for discharging the drilling fluid, comprising the further step of controlling the fluid pressure drop across at least one of said orifices (see Figs. 5-7 and associated description).

Regarding claim 4, changing a cross section area of the orifice controls the pressure drop across the orifice of claim 4 (see Figs. 5-7 and col. 12, lines 24-60).

Regarding claim 5, the bit of claim 1 comprises a drilling fluid pressure relief device 14c, the method comprising the further step of controlling the fluid pressure drop across the fluid pressure relief device (see col. 10, line 58 through col. 13, line 54).

Regarding claim 6, Warren et al disclose a method for inherently optimizing drilling fluid hydraulics when drilling a well bore, the drilling fluid supplied by a surface pump 10 through a drill string 22 to at least one drilling fluid using device 24 or 16 in the drill string, comprising the

steps of monitoring the pressure of the drilling fluid at the device, adjusting a flow rate of the surface pump, and controlling a drilling fluid pressure drop through the device by selecting from the group consisting of restricting the fluid flow, bypassing the fluid flow and relieving the fluid flow, thereby setting the pressure drop and the fluid flow rate through the device (see Figs. 1-7 and col. 3, line 33 through col. 4, line 4).

Regarding claim 7, the device of claim 6 is selected from the currently claimed group (see col. 3, lines 38-44).

Regarding claim 11, Warren et al disclose a drilling fluid using device for use in a drill string 22 when drilling a well bore comprising a drilling fluid flow restricting device 14b or 14c and a drilling fluid flow relief device 14b or 14c, wherein the device 14b or 14c provides both restriction and relief, and wherein in operation the drilling fluid flow restricting device and the drilling fluid flow relief device are remotely adjusted in operation to achieve inherently optimum drilling fluid hydraulics through the device (see Figs. 1 and 4-7, and col. 3, line 33 through col. 4, line 4).

Regarding claim 12, as best understood, the fluid using device of claim 11 is selected from the currently claimed group (see col. 3, lines 38-44).

Regarding claim 13, Warren et al disclose a drill string 22 for drilling a well bore comprising a drill bit 106, the drill bit comprising a drilling fluid flow restricting device 14c and a drilling fluid flow relief device 14c, wherein the device 14c provides both restriction and relief, which are remotely adjusted in operation to achieve inherently optimum drilling fluid hydraulics through the drill bit (see Figs. 5-7 and associated description).

Regarding claim 14, the drill string of claim 13 further comprising a drilling fluid using device 24 comprising a drilling fluid flow restricting device 14b and a drilling fluid flow relief device 14b, wherein the device 14c provides both restriction and relief, and wherein the drilling fluid using device is selected from the currently claimed group (see col. 3, lines 38-44).

10. Claims 1, 3-7, and 11-13 are rejected under 35 U.S.C. 102(e) as being anticipated by US patent 6,698,538 to Kristiansen et al.

Regarding claim 1, Kristiansen et al disclose a method for inherently optimizing drilling fluid hydraulics when drilling a well bore, the drilling fluid supplied by a surface pump 3 through a drill string 4 to a drill bit 10, comprising the step of adjusting the flow rate of the surface pump and a fluid pressure drop across the drill bit while drilling such that the drill bit drilling fluid hydraulics are inherently optimized for a given drilling condition (see Fig. 1 and col. 2, lines 9-19).

Regarding claim 3, the drill bit of claim 1 comprises a plurality of fluid orifices 22 or 24 for discharging the drilling fluid, comprising the further step of controlling the fluid pressure drop across at least one of said orifices (see Figs. 2-4 and associated description).

Regarding claim 4, changing a cross section area of the orifice controls the pressure drop across the orifice of claim 4 (see Fig. 7 and col. 4, lines 41-64).

Regarding claim 5, the bit of claim 1 comprises a drilling fluid pressure relief device 26 or 34, the method comprising the further step of controlling the fluid pressure drop across the fluid pressure relief device (see Figs. 5 and 6, and col. 4, lines 10-40).

Regarding claim 6, Kristiansen et al disclose a method for inherently optimizing drilling fluid hydraulics when drilling a well bore, the drilling fluid supplied by a surface pump 3

through a drill string 4 to at least one drilling fluid using device 10 in the drill string, comprising the steps of monitoring the pressure of the drilling fluid at the device, adjusting a flow rate of the surface pump, and controlling a drilling fluid pressure drop through the device by selecting from the group consisting of restricting the fluid flow, bypassing the fluid flow and relieving the fluid flow, thereby setting the pressure drop and the fluid flow rate through the device (see Figs. 1-7, col. 2, lines 39-65, col. 3, lines 37-47, and col. 4, lines 24-40).

Regarding claim 7, the device of claim 6 is selected from the currently claimed group (see col. 2, lines 9-19).

Regarding claims 11 and 13, Warren et al disclose a drilling fluid using device, or bit 10, for use in a drill string 4 when drilling a well bore comprising a drilling fluid flow restricting device 20A, 26, or 34 and a drilling fluid flow relief device 20A, 26, or 34, wherein the device 20A, 26, or 34 provides both restriction and relief, and wherein in operation the drilling fluid flow restricting device and the drilling fluid flow relief device are remotely adjusted in operation to achieve inherently optimum drilling fluid hydraulics through the device (see Figs. 5-7, and col. 4, lines 10-64).

Regarding claim 12, as best understood, the fluid using device of claim 11 is selected from the currently claimed group (see col. 2, lines 9-19).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 8-10 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warren et al in view of US patent 6,457,958 to Dunn.

Regarding claims 8 and 15, Warren et al teach the method for inherently optimizing drilling fluid hydraulics and the drill string of claims 7 and 14 from above, wherein a fluid using device, or positive displacement motor, is taught (see col. 5, lines 58-62). However, it is not explicitly taught that the device is a Moineau type positive displacement motor or that the flow rate is adjusted in response to a downhole temperature adjacent the motor.

Dunn teaches a positive displacement motor for use downhole similar to that of Warren et al. it is further taught that the motor is a Moineau type positive displacement motor and that the flow rate is adjusted in response to a downhole temperature adjacent the motor (see col. 3, lines 35-50). It would have been obvious to one of ordinary skill in the art, having the teachings of Warren et al and Dunn before him at the time the invention was made, to modify the method and apparatus taught by Warren et al to include the Moineau type motor of Dunn, in order to obtain a motor that can be adjusted to a variety of selected interference fits to meet various operating conditions, as taught by Dunn in col. 2, lines 61-63. One would have been motivated to make such a combination because the motor taught by Dunn is able to operate aver a range of temperatures that are notoriously known to exist downhole, rather than the substantially constant temperature needed for the operation of conventional motors due to interference fit limitations (see col. 2, lines 33-48 of Dunn).

Regarding claims 9, 10, 16, and 17, the combination applied to claims 8 and 15 above teaches that the motor further comprises a rotor sized larger than a stator producing a strong positive interference seal and causing a positive interference fit, wherein an amount of interference fit between the rotor and the stator is set by adjusting a pressure drop of the drilling fluid through the motor (see all figures as well as associated descriptions for the various rotor and stator configurations, and specifically col. 2, line 66 through col. 3, line 50.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ramsey et al teach a bit with fluid orifices that control the pressure drop across the bit and aid in optimizing the drilling fluid hydraulics. Fincher teaches a pressure-modulation valve assembly for use between a motor and a bit. Hunt and Wilde et al teach other types of Moineau type motors that relate interference fit to temperature at the motor.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane Bomar whose telephone number is 571-272-7026. The examiner can normally be reached on Monday - Thursday from 7:00am to 4:30pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 571-272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David J. Bagnell
Supervisory Patent Examiner
Art Unit 3672

tsb
July 28, 2005